regarding topography, climate, and soil, and the typical zonation of the vegetation is outlined. These lakes are within the limits of the *Picea Engelmanni* forest, and the succession from the water's edge includes moor, heath, and meadow associations. Different expressions of these types are to be seen about the various lakes, the moor, with its variations of moss moor, sedge moor, rush moor, willow moor, and meadow moor, usually occupying a large proportion of the area. Perhaps the most interesting of the communities is the heath, in which *Gaultheria humifusa*, *Vaccinium caespitosum*, and *Kalmia microphylla* are conspicuous. Any one of these small undershrubs or a combination of all three may dominate a comparatively narrow belt of vegetation midway between the lake and the forest. The several aspects of the associations are noted, the meadows affording the most brilliant and varied display. Maps, diagrams, quadrats, and lists of species make the report graphic and exact.—GEO. D. FULLER.

Accessory foods for plants.—BOTTOMLEY[35] has found several chlorophyll bearing water plants unable to develop normally in nutrient salt solutions not bearing accessory organic foods. The plants worked on were as follows, naming them in descending order of their dependence upon the organic material: *Lemna major* and *L. minor*, *Salvinia natans*, *Azolla filiculoides*, and *Limnobium stoloniferum*.

"The effective organic substances were found to be present in an autoclaved growth of *Azotobacter chroococcum*, crude nucleic acid derivatives from raw peat, and a water extract of bacterized peat. . . . . In no case did the organic substance supplied exceed 184 parts per million, while the concentration of inorganic salts in the culture solution totaled 5500 parts per million."

The author thinks that these plants in nature secure their necessary organic materials from the waters in which they grow. From the work of BOTTOMLEY and of several other investigators who have recently published their results, it appears that accessory foods may have considerable significance in plant development, as they have very great significance in animal nutrition and growth.—WM. CROCKER.

Rate of photosynthesis in the field—MCLEAN[36] of the Philippines has worked up a simple method of measuring the amount of carbon dioxide absorbed by leaves in the open. There is certainly great need of such methods for determining photosynthetic rates as well as the rates of other plant processes occurring in the field. Recently a farmer who had fertilized heavily with rock phosphate and limestone asked why his corn with about the same foliage stores more than twice as much starch in the ears as his neighbor's corn for

[35] BOTTOMLEY, W. B., The effect of organic matter on the growth of various water plants in culture solutions. Ann. Botany **34**:353–365. 1920.

[36] MCLEAN, F. T., Field studies of the carbon dioxide absorption of coconut leaves. Ann. Botany **34**:367–389. 1920.

which no phosphate or lime was used. Good field methods along with laboratory methods are necessary for answering such questions.

McLEAN finds that middle aged leaves of the coconut absorb carbon dioxide faster than either immature or old leaves. These leaves also show a maximum in the morning, a depression at midday, a second rise in the afternoon, followed by the final decline at sunset. Detached coconut leaves showed about the same rate of absorption as attached ones, but the maxima occurred at different times of day. Sugar-cane leaves absorb much more rapidly than coconut.—WM. CROCKER.

Nitrites and nitrates in plants.—STROWD[37] has worked on the relative accuracy of various methods for determining nitrites and nitrates in plant tissues. He finds that both the Devarda and Schloesing methods with proper modifications give fair accuracy. Various other methods tried proved unsatisfactory. STROWD[38] also finds strong evidence that the reason for failure of nodule production (in soy bean) in the presence of nitrates is due at least in part to the effect of the high concentration of nitrate in the sap upon the growth and reproduction of *Rhizobium leguminosarum*. He finds that the amount of sugar present decreased with an increase in nitrates, but that some sugar was always present. It is unknown to what extent shortage of sugar is significant. The concentration of nitrates in the roots is far in excess of the concentration in the soil bathing the roots.—WM. CROCKER.

Humidity and irrigation.—In the Imperial Valley, California, the irrigation of 400,000 acres of arid lands is commonly supposed to have been accompanied by a decided increase in atmospheric humidity. That this is not the case is shown by data collected by McGREGOR,[39] who concludes that no appreciable influence is exerted upon atmospheric humidity by the amount of irrigation water used, seasonal fluctuations in humidity being accounted for through factors of much greater geographical extent.—GEO. D. FULLER.

Conifer grafting.—The case of a natural grafting of spruce upon pine is reported by ROMELL,[40] who has also investigated the nature of the union as seen in the structure of the wood cells. Along the line of contact there was found evidence of the character of the pits of each being influenced by the proximity of the tissues of the other.—GEO. D. FULLER.

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[37] STROWD, W. H., The determination of nitrites and nitrates in plant tissue. Soil Science **10**:333–342. 1920.

[38] ———, The relation of nitrates to nodule production. Soil Science **10**:343–356. 1920.

[39] McGREGOR, E. A., The relation of irrigation to humidity in a recently reclaimed desert. Plant World **22**:45–52. *figs. 3*. 1919.

[40] ROMELL, LARS-GUNNAR, Anatomy of a grafting of spruce on pine. Meddel. Från Statens Skogsförs. **16**:61–66. *figs. 2*. 1919.